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## NEWS DIGEST

### DOMESTIC

Los Angeles Airways' small helicopter crashed Aug. 27 killing Pilot Carl Dorn and demolishing the \$31,000 passenger check indicates that a motor blade flap drag log key wire, preventing the blade to separate from the rotor head, while the craft was having 100 ft. over Lynwood-Corona helipad. The crash cut LA down to three options, necessitating a temporary arrangement of road routes.

Lt Gen Kenneth B. Wolfe, who assumed July 1 as USAF Deputy Chief of Staff, Materiel, has been appointed president of the Lockheed Ordnance & Arms Corp. of America, subsidiary of the San Gabriel Machine Tool Works. Gen. Wolfe's office in the Duran Building, 1731 E. St., N.W., Washington, D. C., pending final arrangements for other facilities at the new base.

Skidley and Bell helicopters have per capita is now 3,530 assets and expectation of personnel in the Korean theatre.

Holloway Helicopters has postponed scheduled launching of its big, eight-engined flying boat "Because of problems concerning the powerplant (P&W J-460 Wasp Major) which had arisen at the last minute," a spokesman for the firm said and that the launching may be postponed about three months and has applied to KFC. The plane was due to arrive in November, 1947.

Chevy City will build P&W J-460 Wasp Major engines for the Navy in a 1 1/2-million-ft<sup>2</sup> plant to be built in Detroit. The order is estimated at \$400 million.

UAI pilots are due to strike at any time, now that the National Merchants Bank has withdrawn from the strike effort, says Al Low, Vice Pres. ALPA's members committee is said to have promised to give United 72 hours notice before going out.

Col. Kenneth E. Phillips has been named director of the Atomic Energy Commission's division of military applications, succeeding Brig. Gen. James McDonald Jr., assigned in a general assistant to Army Chief of Staff, Department, USAF.

Purchase of a Shaker test free flight, Tom, fair fraction of a guided missile pilot has been approved by the State and House committees on armed services.

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### FINANCIAL

Solar Aircraft Co. net profit for the company's first fiscal quarter ending July 31 was \$345,500 on total sales of \$10,452,500, after provision for depreciation, federal income and excess profits taxes. Backlog currently is \$70,000,000.

Northwest Airlines reports operating revenues during July totaled \$4,270,692 with earnings after provision for taxes being \$109,500. Passenger revenues during the month came to \$3,936,113 and mail revenues were \$169,575.

National Airlines has reported a second net profit of \$1,500,000 for the fiscal year ended June 30, with fixed and fuel expenses amounting to \$24,854,760 up 54% over the previous fiscal year.

Lockheed Aircraft Corp. reported a dividend of 30 cents per share of the new stock resulting from a 2-for-1 stock split authorized recently, payable Sept. 30 in lieu of record of record on Aug. 24.

Northeast Airlines, Inc., has voted a 25-cent a-share dividend payable Sept. 14 to holders of record on Aug. 25.

### INTERNATIONAL

Hawley Page ELP-85 research jet plane, featuring wings that are swept back and then forward, exploded and crashed during a flight test.

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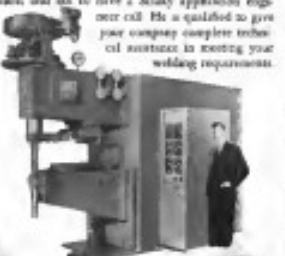
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**AVIATION CALENDAR**

Sept. 27-Kay Aircraft Model Society International competition, Farnborough, England.

Sept. 30-4-Sixth national management conference and exhibit sponsored by the Instrument Society of America, San Antonio Coliseum, Houston, Tex.

Sept. 18-19-Seventh annual ground meet of the American Helicopter Association, Ann Arbor, Michigan School, Ann Arbor, Mich. Program includes one day visit to SHAC, Farmington Hills.

Sept. 31-6th-Twelfth Regional competition in aircraft maintenance by the Society of British Aircraft Constructors, Birmingham, England.

Sept. 15—Tour to Popham, England, sponsored by the National Flying Club, Newcastle Municipal Airport, Mass.

Sept. 17-18-19th annual convention of the International Aerospace Engineers Council, Interlaken National Park, Alberta, Canada.

Sept. 18-20-Annual meeting of the Meteorology Committee of the Nat'l Transport Admin., Cleveland Lodge, Denver.

Sept. 20-Aviation Writers Assn., Northern, with aviation press members. Wings Club, Hotel Biltmore, N.Y.C.

Sept. 26-28-11th meeting of the American Society of Naval Engineers, Hotel Robinson, Minneapolis.

Oct. 2-4-Seventh annual aircraft spark plug and ignition conference sponsored by the Champion Spark Plug Co. of Toledo.

Oct. 14-Annual national aeronautical and engineering display and aircraft performance forum, sponsored by Society of Automotive Engineers, Belmont Hotel, Los Angeles.

Oct. 4-12-1951 conference on aircraft electronic applications, sponsored by the air transportation committee of the American Institute of Electrical Engineers and the Los Angeles section of the Institute, Hollywood Roosevelt Hotel, Hollywood.

Oct. 11-12-1951 conference on airport management and operation, University of Oklahoma, Norman, Okla.

Oct. 16-Proficiency annual New York State meeting on aircraft maintenance and operations, sponsored by the N.Y. State Dept. of Commerce, N.Y. Aviation Trade Assn., Assn. of Towns of the State, Conference of Mayors, County Officers' Assn. and the N.Y. State Flying Farmers, Congress Hotel, Jamestown, N.Y.

Oct. 20-British Industry in Transport, Assn. of County Engineers, Grosvenor Square Club, Marylebone, London.

Oct. 24-25-1951 annual convention of the National Assoc. of State Airlines Officials, Arizona Inn, Tucson, Ariz.

Oct. 13-Nov. 8-Society of Automotive Engineers, Ford and Information meeting, Deller Hotel, Chicago.

Nov. 7—Aviation Wings Club Dinner, Waldorf Astoria, New York.

**PICTURE CREDITS**

1—A. G. Morrison, OEFFA/P; 2—McDonnell Douglas Corp.; 3—McDonnell Douglas Corp.; 4—McDonnell Douglas Corp.; 5—McDonnell Douglas Corp.; 6—McDonnell Douglas Corp.; 7—McDonnell Douglas Corp.



BRITAIN'S LATEST JET RUMBLE. First photo of the new Short SA 6 blunder powered by two Rolls-Royce Avon, mounted in pairs out above the other. Carrying a crew of five, the big new plane has a deep fuselage, and four-wheel logic landing gear.

## New Developments in Military Aviation



PHOTO BY BANSFIELD—McDonnell F3H-2P has its nose extended and retracted to take on different types of cameras for photo reconnaissance at 50 to 50,000 ft. altitude.



RAF'S NEW SWIFT—In quantity production for RAF fighter squadrons, the new English Electric-powered Supersonic Swift shows no regular pattern, surprising while in a turn.



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## WHO'S WHERE

### In the Front Office

A. R. Barnes has been named vice president and section manager for the Photonics Division, Los Angeles. His previous post was in computers.

### Changes

W. W. (Bill) Radcliff has been transferred from Seattle to Wichita plant of Boeing Airplane Co. to act as systems test manager on the B-57 program, and will be succeeded by J. J. (Jack) Clark.

Robert E. Allen has been appointed general manager of the Marine Corp. of America. Other changes in the firm include Joseph Y. Tso as manufacturing manager, Francis D. Condit as production control supervisor, and Rose Adams Henry G. Wilkins (USN, Ret.), has been designated director of customer relations.

Hubert C. Pangle has been placed in charge of Strategic Avionics' new branch office in Dallas.

Mel Root, formerly Lockheed publicity manager, has been made public relations manager of Comsatellite Valley Aircraft.

Louis E. Tolokoff, previously head of production and manufacturing engineering department, formerly of the Boeing Co. (Aviation) Corp., is still engineer.

Chris W. Hall has been designated senior manager of communications for Sola, Sola Corp. at San Diego and Raymond W. Weeks has been named purchasing agent. Hall's post as manager of the New York City office will be filled by Elmer K. Edwards.

James M. Shipp has been appointed deputy regional administrator of CAM's Second Regional Office in Atlanta and W. Wright Holland has been made controller instead of the aquo.

Group Capt. Walter H. Sutton has been appointed senior staff officer, R&P Team Command, with the acting rank of Air Commodore.

Mr. Philip F. (Phil) Long has assumed air traffic control and management of Luis (Phil) de Leon Air Service, Inc. Mr. H. B. Sutton has been made director.

Whitney Bowles, formerly international sales representative for Shikoku Aviation, has been named vicepresident of commercial sales covering South and North America for Scientific Aviation Systems.

Laurens C. Zonneveld has been designated administrative manager to Al French's general manager of the North American and Caribbean division.

### What They're Doing

Warren E. Case has submitted his resignation to the California Airlines Divisions, effective Nov. 1, as state director of maintenance. He had held the position for four years. The committee is asking him to continue in holding a man qualified to fill the post.

## INDUSTRY OBSERVER

The almost instant MiG-15 fighter which was filed on July 21 by nose down U.S. British and ROK, many parts out of 77% of wings on a missile war Nasas when it was shot down by USAF F-86 is going to Cornell University aviation laboratories for engineering analysis, and possibly reconstruction. It was first discovered in photographs made by British planes from the carrier *Cougar*. It was handed to Cornell after a brief examination at AMC laboratory Wright-Patterson AFB.

► Watch for a possible comeback of a new and faster North American B-45 long-range bomber with a new wing, extra thrust chamber or swept tailplane in its present status as a photo-contestant aircraft never powered out in Korea, although the first lens of a B-45 in enemy territory was reported recently.

► A new version of the Douglas C-124 four-engine heavy transport now in development will have a rear cargo door analogous to C-119 so that the airplane can be loaded from the rear if it is extended from the nose. This can be done with elevons characteristic, able to lift a 10,000-lb. load into the plane.

► Australian National Aviation Commission has ordered construction of scales for its British Vickers Viscount jet-propelled planes, after the Australian government obtained permission to import duty-free licensees to assemble the aircraft. Decision as what new equipment will replace the canceled Viscounts has not been disclosed.

► The McDonnell Douglas F3H-2 fighter now in service with Navy squadrons in Korea, is described as the first service-type fighter with an initial rate of climb of 9,000 ft./sec. as a result company announcement.

► Most likely they may be in the configuration of an emergency landing as is Sister Agnes Consilium on a Field road west of Redwood, Va., in that the main thruster which the plane was flying thickened as it landed across does near the upper leading edge of the wing. The open door set up a vibration which shook the aircraft violently causing the pilot to decide on an emergency landing.

► An Allison J-35 turbojet engine matched the 1,000-hr. mark without stage oscillation on Aug. 17 at Edwards AFB, California. The engine, delivered to the 477th Fighter Group at Edwards in 1949, had powered more than 100 different F-84s, underwent six major repairs at a total cost of \$3,500. It has been shipped to Oklahoma City AF devlopment laboratory.

► Marquette-Honeywell is producing a highly sensitive "hot-gyro" gyroscope used for correcting any deviations in flight of guided missiles. Its design was an MIT theory turned down by several aircraft manufacturers as impractical after production engineering concepts failed. Honeywell, however, was set out of two forms of production line. Andries, now well into scale pilot and approach complex development by Marquette-Honeywell, first reported in *Aerospace Week* Jan. 1, p. 36, and subsequently placed as classified by the Navy Dept.

► Transfer of USAF procurement testing activity from Wright-Patterson AFB to the new Joint USAF-NASA Propulsion Development Center at El Centro (Calif.) NASA, points toward greater coordination of procurement and standardization of studies for both activities. Evaluations will be made on propulsive engine systems, small engs supply systems, check recovery systems and propulsive air brakes.

► Convair's XC-99 in-engine gear cargo plane now fitted with new landing gear, grossing 10,000-lbs. at gross weight up to 500,000 lb., is expected to go into USAF service for proposed transcontinental air mail route, if the Post Office Department will bear the expenses.

► Continental Can Co. recently purchased the Dickason Co. of Coffeyville, Kan., a small subcontractor on the Boeing 747 program. This is one of the can company's first moves to get into the growing aviation production field, as its civilian business begins to feel the effects of materials shortages.

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## Washington Roundup

### Race for Atomic Weapons

Competition among the three services for application of the atomic fission weapons that probably hold the key to future military strategy is sharpening.

An Army task force will staff squarely in the race. Major addressed by USAF's Secretary Thomas Fenton and Chief of Staff Gen. Hoyt Vandenberg over looked the long-range bomber and the accelerating strategic bombs significantly. Their subject: USAF's new role of wiping out cities across through threats of atomic artillery and missiles from secret bases.

Army's Chief of Staff, Gen. J. Lawton Collins, was first to fall into line, to follow the fission of atomic bombs and weapons. The Air Force atomic artillery and bombardment for frontal attack and unanswered questions. He advised Senate that we minimize the word of tactical support for ground operations.

The looming struggle of wiping out cities arises holds two fundamental advantages over strategic bombing tactics:

- It doesn't rule the usual uses of destroying concentrations.
- It opens the way for "holding" territory—learning the purpose for the destruction leaders that can keep "boycelling out" enemy landmarks. This dovetails with U.S.'s foreign policy idea of winning allies—other nations won't believe that their brethren won't be over run.

Position emanated: Air Force is placing new atomic weapons of tremendous striking power that could "bring atomic power to bear directly on the enemy's greatest strength. All these are entering into a new situation and we will try all the available political processes to see if at this effective use will be made of atomic weapons against possible targets in the armed conflict."

Vandenberg explained: Atomic tests have "caused a new concern for the air—surroundings on the battlefield."

### Air Power Build-Up Postponed

A boost in air power goals is out for another year. But an increase in present air power targets—a 95% wing Air Force and 15 carrier group Navy air force during 1983 fiscal year—which starts next July 3—is a virtual certainty.

This is the word top Defense Department officials have passed on to the Senate Appropriations Committee.

Reason for the postponement: Makers of planes, parts and equipment can't handle the additional production load. Senate Appropriations commissioners say Administration has "understimated" its growing responsibilities and is gradually calling them together.

Committee is already being threatened to act under the 95% wing Air Force date, which would allow Defense air forces and with them, USAF and Navy expand plans for plane buying. Senate Appropriations Committee is going to convert a substantial part of the \$10 billion for USAF and the \$1 billion 1982 fiscal year budget from cash to contract purchases.

One committee member explained: "What's the point of appropriating more money and letting orders to gather dust in files for another year? What's going to be doing between now and next July is expand the productive capacity to build the planes for a 150- or 185-

wing Air Force and bigger. Now it's seen—not held the plan for 150 wings."

The administration is expected to ask for \$5 billion more for the service shortly—largely to step up industrial production.

But don't look for additional funds this year for aircraft procurement unless international developments change Administration's plans.

### Senate Fight?

At the time for decisions on the future military power drama are, inter-service rivalry is permeating in these quarters. This is the backdrop.

It is also developing in the Senate.

Sen. Sam Nunn (D-Ga.) wants to tank funds for a 1985 wing Air Force program cuts this year's \$6-billion budget and, in effect, close the USAF building down the Pentagon's door.

But, Lodge's move will probably fizzle.

Administration leaders will point out: Military chiefs are revering the defense program, including the air power build-up, to let them decide it. Most stations, however, are swelling Federal spending, are likely to follow.

Sen. Robert Taft's campaign for an all-out build-up of strategic air power in favor of a "ground war" operation in Europe has undergone a setback. Taft and his lieutenant aren't going to try to dash Army funds and channel them into USAF if they signed muscle back.

Taft's military policy now is: Since the Administration has committed the U.S. to defend Europe, Congress should support Gen. Creighton Abrams' efforts.

### Pentagon Fight?

The Joint Chiefs of Staff and Secretary of Defense are scheduled to decide overall policy questions and aims at a 1985 fiscal year military program on Sept. 10. The process then goes in the Administration for review.

The crux of inter-service differences: Navy wants USAF's calling a 95% wing, more emphasis on expansion of Navy's. And Army and USAF are at odds over tactical aviation.

### Open Fight?

A continuing rise in all the defense budgets by House Armed Services Committee seems inevitable shortly after members return from vacation Sept. 12.

The time is long past due to change the statute that sets USAF's strength at "not to exceed 70 groups." And committee chairman Carl Vinson wants to get the ball rolling, the Administration is decreasing the new at present description.

Department of Defense has asked a simple repeat of the defense conversion. This would leave USAF's rate to Administration decision.

Various wings authorizations for 165 wings, including 150 combatant wings—more modest than the Lodge proposed for 156 combatant wings—spilled out in his.

Committee members, led by Rep. Stenning Cole, went two miles at the heart of aircraft difficulties packaged into the hearings on USAF's future composition.

• A comparative evaluation of Navy, Marine, and USAF tactical air techniques.

• Transfer of USAF's tactical air arm to Army control.

—Katherine Johnson

# AVIATION WEEK

## Materials Lack Hampers Plane Industry

Civilian production continues to bite into scarce supply while aircraft plants wait.

By Alexander McSorley

The U.S. aircraft industry is beginning to find out about its materials shortage the hard way.

Controlled Materials Plans, as was anticipated in opening its wheels to greater use, is rapidly starting. The buildup of U.S. aircraft production is definitely leading the pack of scarce materials and will continue to do so through the fourth quarter of this year and well into 1982, before additional materials capacity comes on stream.

► **Production Facts**—Despite any progress for increased air power which the Department of Defense may voice, the fact is:

• Civil production: The continuing high rate of civilian production is causing a large share of available materials.

• Aircraft production: along with their defense production, is not getting what it is asking for.

Moreover, says Capt. Bill Felt, there is a paradoxical situation (See Washington Report). Caught up in its intent to cut back proposed increases in power levels on the theory that production cannot be increased to use up the additional funds, if they were provided.

• Structural Steel—One of the most direct blocks an early growth of aircraft production capacity is the shortage in structural steel. Although the situation is not as bad as made out by some, the majority of contractors to the defense program, the military services are looking out for their own new base expansion and construction and such groups as the Aerospace Research Commission have the highest priority ratings. Then too, there is a high priority for construction of additional nuclear fuel facilities and for construction of additional facilities for production of steel and aluminum.

The losses aircraft plant programs (although they are for direct military aircraft production) in many cases will drown the priority lists.

For example, Lockheed and Northrop, builders of radar-equipped night fighter interceptors, will in our air defense strip, find their proposed new buildings that are well down on their

Expansion Group Lists No. 2 and 3.

In a number of cases, U.S. aircraft plants are short of materials needed to produce green license builds, particularly, it is reported.

► **CMP Alleviates Some**: Prestige aircraft companies like the Aircraft Production Research Agency had made on expanded aircrafts for the third quarter, as a "necessary solution" to a bad problem that could not be solved quickly.

It is understood that virtually all the aircraft manufacturers have filed for extension of allowances but that very few extensions could be made under the total amount of controlled contracts which were slated to be of benefit for aircraft.

► **Industrial**: The aircraft industry also has had its concerned elements in the fourth quarter, although less equally due to increased aircraft materials allowances than to other factors.

► **Military Tools**: Sources close to the machine tool bottleneck suspect that tooling capacity problems are on their way to fruition, with the promised adjustment of pricing levels and with high priority on building replacement going to the anchor tool plant again.

But the recent statement of Clay T. Moore, head of Capitol Hill, that aircraft tooling in the overall sense is in the solvent of should (MR. Boyer, Aircraft Pro-

Bolted, Deputy Defense Production Administrator for procurement and production, of "gold plate" in my view, would people believe, when he says: "The road is now clear, the machine tool industry is steadily increasing its output and we will get the machine tools we need without fail."

► **Other**: Other signs that we have contemplated is procurement would include folks addition of Navy production tools now available in Navy facilities for new defense production. One suggestion is to take the tools from the facilities, but another is that the Navy prefers us to have them obtain on the spot.

► **Forge Structures**: A critical tonnage situation in aircraft forgings continues as a result of after effects of the Alcoa forge plant strike in Cleveland. A machined plate plant which Weller Overland is operating at East Peoria, is not yet giving any high rate of production due to shortage of skilled workers, principally die makers and heavy maintenance men.

Carrying the load of the forgings load currently are the Cleveland plant and the Wyman-Crosley Co. of Worcester, Mass. While Alcan (Aluminum Co. of Canada Ltd.) is issuing increasingly into the forgings picture in this country, despite opposition of some American producers.

► **AIRF**: A Bright Spot—So as a bright spot in the overall scene is the solvent of Hirsch (MR. Boyer, Aircraft Pro-



WHEN THE BOTTOM IS LOWERED

Fokker's KC-135 Park Plane was among Detroit's interesting plot throws belly on static displays during the National Air Races, attraction when park is detached.

diation-based elements, in a new venture in policy making levels, to tackle the aircraft industry's problems head-on. Beyer gets a large share of credit among aviation industry people for getting the unusually serious resistance tool problem on its way to solution, but his first job after he moved in. They liked it, and we wanted to see more of it.

► **Manufacturing Materials** — Action is being taken to remedy the oversight which left aircraft manufacturers out of the CIMP. The aircraft industry has long depended on these "private" stipulations for thousands of requirements between the relatively small scale orders which saw no incentive builder can place at one time. Proactive has been for the manufacturers to buy well said of various vehicles, which are too large for one plant builder to take, single, and then sell them in lots that will not fit in the aircraft envelope. A typical aircraft company may pack as many as 30,000 separate items of material away from them or do it in this manner. From word-of-mouth, the aircraft industry has quantity production of material, but largely forwarded as next year, as an approach not related to some of the original specified packages. Production rate is reported to be stepped up to around 600 tons a year, by the end of this year.

It should go to about five states that figure, by the end of 1972, after a Tattinger Metals Co. plant in Nevada gets rolling.

The defense makers have their problems too, probably the best not prevent manufacturing in another, as regards tooling shortages, parts inventories and funding shortages are the easy components. An effort to use single-purpose machinery is in order to get away from tooling, though, proving effective in a limited extent, but it is obviously raising the production costs over what they would be if the same work was done with more modern and complex tooling, especially adapted to the job.

## Global Jet Service

Better is moving fast toward forming a transnational jet-leasing ring around the globe.

Last week, publicists' conference at Sydney, Australia, planned 20 big, Sydney-based aircraft, to be by the Hortons' Comet the end of next year. Each Comet would carry 40 passengers.

This would be provided by British Commonwealth Pacific Airways, using two Comets.

Meanwhile, British Overseas Airways is bringing in the Comet as the London Caribbean, with London Society next on the list. And Canadian Pacific Air Lines, with a Vancouver Sea Fury into Hiroshima run, has two on order.

## Dispersal: A Guide for Tomorrow

While future construction may be away from crowded areas, present aircraft plants appear to be set.

Map: U.S. aircraft manufacturers, now three in so-called coastal areas, need not expect their present plants to be affected materially by the recent reversal of public policy emphasis on plant dispersal for promotion against atomic attack.

As Force Undersecretary John A. MacCains has stated, as apply to an American West inquiry, but if one prefers the principal plan harboring the plants and equipment for the flying Air Force are already set.

And he does not expect the direction

now by Defense Minister Charles E. Wilson calling for a 30-day suspension of all construction concessions on new plant expansion to affect seriously further expansion needed for USAF programs even on the 30-year level recently proposed by Rep. Carl A. Vinson.

► **President Call** — President Truman's message to government agencies and that in the years since 1945 more than \$11 billion had been spent on new plants and equipment, but that during that time, except for a few instances, there has been no so pronounced trend away from the heavily concentrated centers.

Although the message may not be the least effort for him, "the danger of atomic attack, gross and demands that we and more pertinent nuclear be put into effect to allow added security for our industrial establishment without jeopardizing its industrial efficiency.

Our policy, therefore, must be directed toward the disposal of new and existing industries."

► **With Off-Site Downside** — Defense Minister Wilson directed Manly Fincham, Defense Production Adviser, to call a 30-day suspension of the program and which the government alone, defense manufacturers to assume costs of construction of new facilities over a period of five years instead of the usual method followed, up to 1970. World War II of 20 to 25 years.

The Wilson directive provided that defense DPA shall issue the need for the disposal of facilities in accord with the new pattern established by the National Security Resources Board and approved by the President, is subsequently recognized when contracts are granted.

Presumably, the assets which defense applicants require for certificates would remain intact, though, by law, they were made available for plant location at a distance from other industrial concentrations, than if they were unconstrained, or, equivalently, of existing factories to already crowded areas.

When the Defense Mobilization Order No. 11 declared a 60-day suspension order was necessary to review the entire need with off-site construction progress offered to induce industry expansion

further delay may constitute action as to dispersal of industrial centers.

Stu Edward Martin has introduced a bill to amend the Defense Production Act prohibiting the executive department and agencies from putting any effect to the proposed legislation. Mr. Martin described the NBS dispersal plan as a "long-term coherent and sound program which could in fact capture the successful portion of American industry," and called it "absolute power to impose a death sentence on any American industry—if so the name of national defense."

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"To assure consistency between the

grants of security certificates and the determination of expansion goals," Wilson said, "certificates shall be granted only for facilities that are included within expansion goal determined by the Defense Production Administration to be necessary to meet national defense needs."

Because of the extremely tight situation in this availability of critical materials, he told Manly Fincham in a letter explaining his action, it is most unlikely that new facility construction can proceed beyond that now planned for several months, except for the coast project projects. "In the light of this situation I am hardly impacting you to effect a general suspension on the granting of additional facility construction certificates for a period of at least 60 days, beginning Aug. 31."

► **For Exceptions** — Exceptions to the general suspension should be made to accommodate such that could be made in agreement with the Defense Production Admin.

► **Requires for Authorization** — which takes Sept. 23 in accordance with provisions of the act.

► **Authorization of Facilities** — quickly required for production of specific military and items.

► **Authorization of Facilities** — rapidly needed for expansion of certain and essential products.

► **Authorization of Facilities** — required to round out originally needed expansion projects now under way.

► **Authorization** — which will not impair ability of certain materials in excess of standards currently prescribed for facility construction.

► **Time for Review** — Wilson said, the memorandum will affect opportunity for review of administrative panelized and extraneous which certificates are granted and percentages determined.

During early stages of mobilization it was essential to get expansion of facilities under way as rapidly as possible, and material shortages were not then a factor.

"As we move closer to the realization of expansion goals within specific categories," Wilson said, "we should update our standards and adjust to specific rules wherever possible." This will result in lower percentages of inactivation although there will be specific categories which will not fit patterns he used.

► **Disposal** — Mechanics of disposal is so likely that low person in government of relevant have had the necessary to tackle it, a Defense Department spokesman disclosed. Ideally, he said, industry, labor and government favor it. From point of practicality, however, it is not ideal commercially.

In the case of the assault industry,

new building procurement plants in present locations. These personnel have become firmly entrenched socially and economically. In most instances the manufacturer has built more heavily populated areas. He may find that in some areas, however, may move to another world scarcely damage the economic condition of the company, as personnel had in a good many reduces the city in which the plant is located.

At Air Force and Navy, as building for aircraft production of and equipment in at least two separate geographic locations for each force. For example, production of the Boeing B-47 is under way at Wichita, Kansas, and at Mather Air Force Base, Calif., while building the North American F-100 jet fighter at Columbus, Ohio, while the Fairchild Republic A-10 Thunderbolt II at North American's Los Angeles plant.

Despite of major components, electronic systems and engines, a site has been selected in the new location, both by Air Force and Navy.

► **Your Plant** — Target — Mississauga, Jack Corone, acting chairman of No. 1000 Senate Resources Board, issued a booklet entitled "Is Your Plant a Target?" explaining NSRB's stand on industrial dispersion, designed to warn the effects of any atomic bombing attack on the United States.

In a foreword, Senator Corone writes: "With President Truman's policy letter on plant dispersal," Corone said, "The Senate Research Board's plant, Lt. Col. Frank K. Everett, stricken to safety about the B-52 just before the X-10 was released.

of the intent of the atomic bomb. This means that an industrial area in the nation can be considered safe from attack."

Industry can qualify for federal assistance by having an industrial area removed from the border of atomic warfare. These measures are incentives for accelerated tax amortization, shipment of critical materials for construction, defense loans and defense contracts.

► **Goals** — outlined the lagged-for industrial dispersals.

► **Disperse new industry and expanding industry**, do not move established industry.

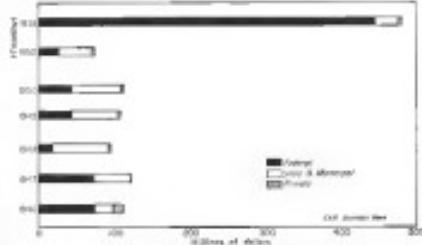
► **Do not build up one region of the country at the expense of another**.

► **Industrial dispersion** can be carried out deployment a confined to each local neighborhood.

► **State and local governments**, in cooperation with private enterprise, will be called upon to take the initiative in this defense objective.

## Bell X-1D Destroyed in Mid-Air Mishap

A Bell X-1D research plane suffered a midair collision prior to impacting from a B-52母机 at AFM on Aug. 23 and was destroyed at 10,000 ft, exploded and caught fire as it nosed down. The two research plane's pilot, Lt. Col. Frank K. Everett, stricken to safety about the B-52 just before the X-10 was released.



## FEDERAL AIRPORT WORK SOARS

Story income in civilian airport construction volume is probably above share. Federal airport work 2,500,000 sq ft, the firm never before of the year, compared with its peak in 1950, 2,417,000 sq ft, and measured for 95% of all airport work last. Federal airports are being given for many studies and expansion of present work, with

emphasis shifted from larger and buildings to narrow extensions and taxways. Civilian airport work has dropped sharply, still and airport facilities, 500,000 sq ft, 511 million, and commercial airports only less than one percent of the total for the year. The one new was completed by Engineering News-Record, a McGraw-Hill subsidiary.



AIRBORNE TRAFFIC LIGHTS

Installation of these plastic photoelectric devices on belly of Boeing KC-97 and EC-97 tankers greatly reduced the number of shorts in refueling operations, particularly at night. The lights are automatically triggered by motion. Green color provides visual alert during paper contact.



are the best in the business in close support tactics, at their disposal. But it is not the power cameras or a huge load of bombs that account for greater success," Wohlleben explained.

There are some, Wohlleben continued, who believe that USAF tactical aviation should be broken up into "money pockets" and controlled at division headquarters and corps headquarters levels. This is far from the "cockpit" point of view, he commented, but would ensure the overall mobility of tactical aviation for which the Air Force is responsible.

► **Marine, AF Mission.** Marine Corps aviation, it was pointed out, was set up specifically for support of its combat troops. And less than two months ago, of the USAF's 185 Air Forces, for the same time, has had no assignment of which tactical support for ground troops is one. Strategic and defense air carry priority over tactical air, one spokesman explained. "Retention of major ground troops through air quantities and types of interest aircraft would be ideal. We would like to provide it for our troops but unfortunately Air Force battle experience forbids it," he said.

General Clark was very outspoken in his demands for complete air mobility of his troops and the need for that close behind support by USAF. He declared: "We are going to get the best this air support can do whatever the price." And he added, "The price will get us where we want to go."

He selected four areas where considerable issues at which Army and Air Force were at odds on policy-making levels but he said that he felt one day those would be resolved shortly. The issues were, he said, that of operational control.

Induced of General Wohlleben's statements in reference to "money pocket" tactical air support, Clark said: "I know of no responsible person in the United States Army who wants it at odds with the Service." He said, "that operational control is tactical air support should be given over to the ground commander during the conduct of ground battle."

Later in summation of General Southern's file, one Air Force officer described the war was going as a completely successful massive training war for Army troops, but wholly inadequate from Air Force point of view. "We are so short of aircraft—over 100 different types that most of our participation has had to be maintained. The boys have done some wonderful flying during the past week, but the equipment! Well it's like riding a team in the absence of Horses."

General Van Dorn, when he said we had a "showing" Air Force.

► **The Shoestring-Vandenberg was seriously taken to task in Congress for**



AMBULANCE SERVICES is one of the uses to which de Havilland Beavers can be put.

## Busy Beaver

**Army, AF will share in procurement of 185 light transports.**

Army and Air Force will share procurement costs of approximately 185 Consolidated or Hawker Beech light transports, it was announced recently. Under an arrangement between the services USAF will serve Army in craft weight limitations to permit Army to secure some steady needed transport.

National Guard would aerial assault members of platoons each would recruit, but an Army spokesman and the division of planes would be dosage equal, with Army getting a slightly larger share. Dollar cost of the contract will not disclosed, although an industry source in Washington indicated that production costs of the planes including delivery would aggregate \$15,000 each. That would give total unit purchase cost at about \$1 million.

► **Army Beavers.** The Army is procuring the Beaver primarily for use as a multi-place personnel transport, although ultimately the plane would be used extensively as a light-duty transport and in field bases, including supply and passenger service; light supply dropping, aerial observation, aerial maintenance, communications control, aerial survey, flying and mapmaking, charting.

► **At Air Force Beavers.** While some Beavers will probably end their war生涯 with independent assignments for liaison work, the bulk of the USAF planes are scheduled for delivery to Air Rescue Service.

AIR Force offices have long sought procurement of the Beaver for activities in

published reports attributed to have disclosed that USAF was operating a "skirmishing" force.

At Air Force bases taking part in the joint Air-Sea Rescue operations were 9th Air Force, 10th Wing, Tactical Control Group, units of the 10th Fighter-Bomber

Wing, 26th Tactical Reconnaissance Wing, 15th Fighter Bomber Wing, 14th Fighter Bomber Wing, 13th Fighter Bomber Wing, 11th Tactical Reconnaissance Wing, and 6th Bomb Squadron. Their corner detail was performed by the 11th Air Force.

The FA North, having watched its performance by both Canadian military and civilian users in the Canadian Northwest and in Alaska.

Design of the plane as a Canadian

bus

bus plane was based upon results of a survey conducted among almost 100 bush operators from coast to coast who operated craft under greatly varying climatic and geographical conditions. The first prototype was in August, 1952.

Wingspan of the Beaver is 48 ft., length 38 ft. 5 in., height 10 ft. 7 in. Powered by a Pratt &

Whitney R-985 Wasp Junior developing 450 hp, the Beaver weighs 3,775 lb

empty and 6,000 lb loaded.

► **Procurement Background.** Last year Air Force agreed to an evolution of various liaison-type aircraft including the Air Commando, Ryan Navion, Convair 110, Alouette, Bellanca Skymaster and the de Havilland Beaver (Aviation Week Dec. 15, p. 15).

Military requirements for the competition indicated that the competing planes be able to take off over a 50-ft.

straight runout, be able to fly 300 ft.

and land over 50 ft. obstacle clearance 600 ft.

The plane was to have a rate of climb, on level, of at least 1,000 ft. the first minute; a maximum endurance of at least 5 hr.; a cruising speed of at least 135 mph; plus a landing speed with full control of not more than 50 knots; a service ceiling of 15,000 ft., and a radius of action of at least 220 nautical miles.

An Air Force spokesman further indicated that the plane must be operable in temperature range from -20° to +120° F., and with provision of modification kits to extend that to -65° F.

The competition was completed in two weeks during December, 1952, and won by the Beaver.



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# AERONAUTICAL ENGINEERING

## Refinements Aid Metal Fatigue Studies

Special testing units developed at National Bureau of Standards afford better control and more speed.

Intense testing of aircraft metals will be facilitated with new techniques developed at the National Bureau of Standards.

These new test methods include devices for stopping the testing machine when a small crack forms in the specimen, apparatus for uniform polishing of specimens, and a method for testing without resorting to breaking. All were developed by NBS technician Julius A. Howell and James C. Bauer.

► **Stoppage Device.** The vibration region of a fatigue-testing machine is divided into two stages. In the first stage, the metal is stressed by the machine until a small crack forms. In the second stage, the crack grows until the machine's scanning contraction is too small to support the applied load, and complete fracture follows.

In fatigue studies it is usually desirable to determine the number of cycles of stress required to start the crack, as well as the number to complete the fracture. These determinations can be obtained if the testing machine can be stopped automatically when a small crack forms. The two-stopping device for this purpose already has been put into operation at NBS.

In typical fatigue machine the 25-mm diameter specimen is clamped into a fixture which holds the specimen and loaded at the rate near the specimen by weight, using an hydraulic press.

This loading results in a deflection of the loading beam, and the deflection increases when a crack forms in the specimen. If the crack is only on one side of the specimen, the deflection will vary periodically with each rotation of the specimen—the beam will vibrate.

With the deflection and vibration rate known, it is possible to use the NBS stopping device. One feature is a deflection switch which is used electrically, with three contacts connected in parallel. Sometimes one will respond fast, sometimes the other, depending on the periodicity of the periodic movement.

► **Deflection Stop.** The deflection unit consists of a Micro Switch operated by a lever fixed rigidly to one end of the bearing beam, the other end carrying an adjustable screw which bears on the Mono-Swiftly retaining leaf.

In finding specimens it is easier that the direction of polishing be parallel to the diameter of the axis to be applied in the fatigue test. This avoids stress concentrations at the ends of the specimen. It also is important that clamping pressure be light to avoid excessive surface cold-working. If these requirements are met, the surface need not be unusually smooth or highly polished.

Two types of specimens, rough and polished, are used in NBS fatigue tests. The rough specimens have flat surfaces; the polished specimens have what may be called a "pebbled" surface resulting from an irregular crack in one end of the specimen which splits the half from its peak. In filling the hole an electrical current that shorts off the crack.

Sensitivity of the device may be adjusted by varying the separation distances of the parallel prongs.

► **Polishing Refinement.** The surface condition of test specimens has an important effect on fatigue life. It must be made as uniform as possible. Two pieces of apparatus developed by NBS help greatly eliminate radial periodic cyclic deformation of the polishing pad used to polish one specimen to the next.

The wheel consists of a large number of metal spring leaves, radiating outward from a hub, which press against the abrasive belt. These spring leaves conform the abrasive belt to the contour of the specimen and remove surface asperities.

The wheel loading is done by a device which bears a constant relation (1 to 180) to the radius of the abrasive wheel. Because the specimen is caused to slide across the abrasive belt, frictional heat is generated which causes the abrasive belt to cut rapidly, much faster than a rubbing action. A rubbing action should be avoided since it tends to produce more cold work on the specimen surface.

► **Smooth Specimen Holder.** The apparatus for holding smooth polished test specimens is new only a few details. It consists essentially of an abrasive-coated wheel which rotates against the bottom of the article while the specimen is slowly carried.

The specimen is held in a small bushing. A wire motor, mounted on the circular grid, holds the axis of rotation perpendicular to the axis of the specimen, drives the polishing wheel.



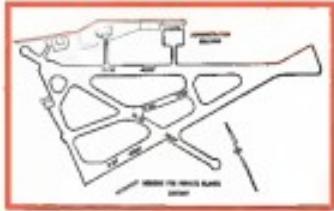
**CYCLOPEAN EYE**  
Cylindrical Mono-Swiftly fixture now holds notches of glide path surfaces, part of ILS gear. Nose cap removed by holding two clamps, assist with adjustment of Mono-Swiftly retaining leaf.

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Mr. J. Robert Bradley, private pilot, Ryan 180, with Fred Koenig, airport manager, while his plane is serviced through Esso hydraulic system

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**THE WILLIAMSPORT, PENNSYLVANIA, MUNICIPAL AIRPORT**  
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On the grounds the airport has an acreage of 150 but there are few trees. There are two lighted, concrete runways 4800 and 4900 feet in length with two additional black-top runways of 3000 and 2200 feet. The field is lighted.

The new Administration Building has 10,000 feet of floor space and includes administrative offices, freight and express rooms, a complete restaurant, The Interstate Army Commissary (Item #2), a complete gift shop, and the United States Weather Bureau also maintains its office in this building.

through a short rubber coupling. A guide for the polishing wire is supported by a pivot assembly above the working table so that the weight of the guide holds the wire against the specimen. The shank is then at a regulated rate of steady and wave-free feed to the work being a reference through a valve-controlled table.

The motor that drives the polishing wheel also drives the beltwheel of the lathe through a 100 to 1 reducing gear. By keeping rotation speed and polishing time constant, as well as the ratio of wire speed to specimen speed, high uniformity of finish is insured.

And the finish is very similar to that produced by the methods for finishing aircraft surfaces.

► **The Sheet Metalworking Division** of the hard-detective material manufacturing division is about 80% free from nonconformities caused by foreign materials in bending on conventional available tools and techniques of the problem type.

By deflecting the specimen as a column, a newly-developed NBS fatigue-testing machine makes possible the bending of specimens to a safe radius of curvature without large amplitudes of motion in the driving mechanism. Because the machine holds several specimens at once, considerable testing time may be saved.

The new sheet metal fatigue test is adapted from a standard plate load testing machine. Specimens are held in a U-shaped mold by grooves in two horizontal arms. While the lower arm remains stationary, the upper is pivoted at one end, is moved up and down at the other end by a crank arm and adjustable eccentric. At the top of the crank-shaft the arms are parallel, and the distance between the grooves equals the length of the specimen. When the upper arm is moved down by the crank, the specimen is loaded in tension until minute bend occurs. Bending is greatest, of course, for the specimen near the eccentric.

An automatic stopping device guards the machine takes advantage of the fact that after a crack forms, the specimen no longer deforms in a smooth curve. An adjustable contact assembly is changed to the lower arm of the machine and adjusted so that the intact specimen doesn't touch the crank pin fails to touch the contact disk at its maximum deflection.

Crank tends to turn near the center of the specimen, and when a crack starts, a "ungee effect" causes the middle of the specimen to deflect more into tight contact with the disk. This contact severs an electrical relay, stopping the machine.

When a group of selected specimens are set up in the machine, the time necessary to make the tests, if subjected to

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# REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND



NEW DELTA CONFIGURATION. British Avro 707A, in a high sweepwing with leading gear fixed and sharply tipped wing.

## Avro 707A

New aircraft features wing root inlets and boundary layer fence.

For the final time in a row, A. V. Roe & Co. Ltd., Manchester, England, has revealed a new delta-winged aircraft just before the First 11-16 show of the Society of British Aircraft Cos. directors. This year's model is drop-nosed the 707A, and differs from its predecessor in having wing root inlets for the turboprop engine instead of a closed leading edge.

First 707 evolved shortly after the 1949 SBAC show, the second—the B model—was in the static display at the 1950 show (AVIATION Week, Oct. 5, 1950, p. 20).

**Delta feature.**—The series of delta aircraft by Avro have been preceded by British-Force Dornier designs. In the 707 and the 707A, as in the design, was taken as based on a delta mounted on a relatively low efficiency. The reason for such a location was first at the time they were not any other place to take up as.

But the later T-47 uses other conventional wing inlets with a boundary-layer fence between the inlet and the fence. These inlets appear to be the only difference between the A and its sister sister.

Apparently Avro has done some thing with the location of the 707A and not. That company's last announcement in the Aeroplane, July 23, shows considerable work in the form of the air intake. In its current form, the inlet resembles some of the NACA's so-called high-speed inlets which were



developed here some years back, and tested, notably on the Avro F.28 and especially Lockheed's F-104. The latter has a fence and the upper lip of the airway passes more into the inlet than the under lip does. It also appears that the whole lip is forward of its previous location.

These modifications should increase

the pressure at the engine inlet (which is another way of saying that it improves the many who perhaps had the anxiety over the potential altitude curve up through the afterburner fire danger). The 707A is painted salmon pink, the 707B bright blue.

Span of the 707A is 34 ft. 2 in., length without jetlet head, 34 ft. 4 in.

# We're up to our *Ears* ...and we like it —and we know what caused it...



An IOWA timer previous year has been recognized and rewarded also many other individuals and organizations for their contributions to the development of the program, and encouraged by skilled craftsmen and encouraged by rigid inspection.

Rewards...  
...and 3000 Dime rewards you know what  
awarded at:



This present award for 2000 MACHINERSHIP—  
IOWA's new after-guiding, high precision  
machining process.



## NACA Reports

**Plethora** is a Study Formed by Two Keeping Jets ITN 2149—by Marcus F. Biederman and Jack C. Blodgett.

The rocket motor, at any expansion ratio will tell you, ostensibly simulates the forces between natural and man-made boundaries. Under certain conditions, it will exhibit instability characteristics by sustained oscillations. These instabilities occur at frequencies that vary from approximately 20 up to several thousand cycles per second.

The low frequency range may be explained by resonance as a result when the propellant feed system and the rocket chamber are dynamically coupled. No such statement readily applies the instability at higher frequencies, however.

In the high frequency range, combustion instability appears to originate in the injection and mixing process. Because of this relation, NACA has investigated the flow characteristics and the spray patterns formed on the impingement of two liquid jets.

Two experiments were conducted. In one of them, the supply pressure of the two jets was varied over the impingement angle and the length of the jet before impingement. Water was used as a liquid for all investigations; spray flow was determined from rate meter readings.

The spray was studied by visual, photographic, and photofluorescent techniques. High-speed motion pictures and microfilm photographs were taken of the spray pattern.

Following results were obtained from this investigation. Upon separation of the jets, a nubbed sheet of liquid was found to propagate to the point of the impingement. This sheet then diverged, ultimately forming a group of spray that appears as two propagating sheets that meet at the point of impingement.

The divergence of the liquid sheet resulted in incomplete spacing between water and propylene oxide streams. There was a large number of small water droplets.

Under certain operating conditions, the frequency of wave formation increased over a finite time interval, increasing the jet velocity increased the wave frequency, or a relation which approached a direct proportionality. Increasing the impingement angle decreased the wave frequency for impingement angles between 30 and 100 degrees.

Doubling the diameter of the jet had a negligible effect on wave frequency compared to the effect of jet velocity and impingement angle. Changing the jet length from 10 to 30 degrees before impingement produced negligible

effect on the frequency of the waves.

Analysis of the photographic and diagnostic data obtained shows that the rolling of the liquid sheet occurs at the point of disintegration of the sheet. Furthermore, the rolling determines the frequency of the wave formation. As a final note, regulation of the jets before impingement may be instrumental in controlling the rolling of the liquid sheet as is the fraction of the sheet.

**Effect of Aspect Ratio on the Low-Speed Laminar Control Characteristics of Un swept Unigated Low-Angle-Rate Wings** (ITN 2145)—by Roger L. Norquist and William M. O'Hearn.

This report is intended to add to the work which has been done to determine laminar control characteristics of wings with aspect ratios of less than 6. These wind-tunnel tests were made on a series of average unigated wings of aspect ratios 1.43, 2.13, 4.13, and 6.13. The wings were fitted with varied ratios of 75% chord with various span and various quarter chord.

The results of this test indicated the following conclusions:

- The variation of experimental lift effectiveness with aspect ratio could not be satisfactorily predicted, for all kinds of choices, by any one of these theoretical methods with which comparisons were made.
- Problems associated with adverse pressure gradients became more and more prominent as the angle of attack increased and the length of the jet before impingement. Water was used as a liquid for all investigations; spray flow was determined from rate meter readings.

The spray was studied by visual, photographic, and photofluorescent techniques. High-speed motion pictures and microfilm photographs were taken of the spray pattern.

Following results were obtained from this investigation.

Upon separation of the jets, a nubbed sheet of liquid was found to propagate to the point of the impingement. This sheet then diverged, ultimately forming a group of spray that appears as two propagating sheets that meet at the point of impingement.

The divergence of the liquid sheet resulted in incomplete spacing between water and propylene oxide streams. There was a large number of small water droplets.

Under certain operating conditions, the frequency of wave formation increased over a finite time interval, increasing the jet velocity increased the wave frequency, or a relation which approached a direct proportionality. Increasing the impingement angle decreased the wave frequency for impingement angles between 30 and 100 degrees.

Doubling the diameter of the jet had a negligible effect on wave frequency compared to the effect of jet velocity and impingement angle. Changing the jet length from 10 to 30 degrees before impingement produced negligible

effect on the frequency of the waves.

Analysis of the photographic and diagnostic data obtained shows that the rolling of the liquid sheet occurs at the point of disintegration of the sheet. Furthermore, the rolling determines the frequency of the wave formation. As a final note, regulation of the jets before impingement may be instrumental in controlling the rolling of the liquid sheet as is the fraction of the sheet.

Interpretation of the wind-pressure field on to the transonic-field field behind the body was used to estimate the change in base pressure. Comparing this estimation with the experimental values indicated in most cases that the trend in the variation of the base drag could be predicted by this approach method. However, in most tail-free cases, the quantitative agreement was poor.

Two numerical methods have been developed among operators today. They are used to calculate the trailing load of a transonic aircraft subjected to pure bending. The basic difference is that of a simplified criterion which includes only the most highly cambered portion of the cylinder. The first of the two methods uses a 14-mm decrement, and the second method requires the selection of a single 18-mm decrement. The trailing loads at 3 cylinders with widely different chord increments were calculated by these methods, and reasonable agreement was obtained with experiment.

A procedure similar to the first method was developed for calculating the trailing load of a cylinder with a twist. A similar experimental check was obtained for the procedure.

This work was carried on at the Polytechnic Institute of Brooklyn, and was used by and conducted with financial aid from NACA.

**On the Second-Order Trans Wall Construction Criterion in Two-Dimensional Compressible Flow** (ITN 2150)—by E. B. Kiesler and Keith C. Blasius.

This report reexamines the question of trans wall connection in the solution of analogous problems in the hydrodynamic speed range by the use of boundary-layer theory.

The flow past a sharp-edged, rectangular, two-dimensional body at a fixed chord is solved by means of the first- and second-order Prandtl-Boundary layer equations. An expression is derived for the trans wall connection with the use of these solutions.

For a parabolic airfoil, the natural wall connection is calculated to estimate the effect of camberability, ratio of the chord height to the chord length, and chord thickness coefficient.

It appears that for cases where the trans wall connection is significant, both second-order effects and the variation of the camber along the chord should be considered.

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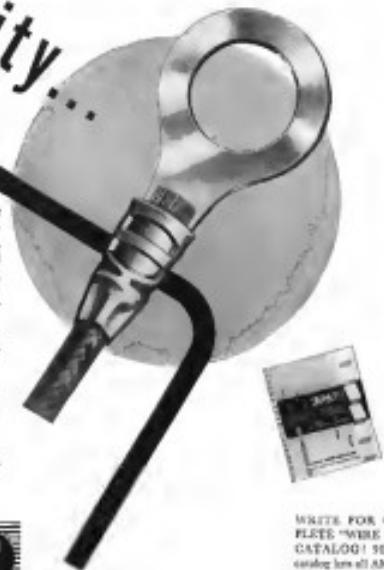
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**BULLARD VERTICAL TURRET LATHE** (left) features high torque and wide feed; Torsion hydraulic duplicator (right) converts Bullard vertical turret lathe into an automatic production tool.



high arc easily turned on the lathe. With that machine, production of the .45-in. external fuel tank rings should be stepped up 23% over prior one methods. And production time should be boosted for steel nests, all frames and other jet engine parts.

One uses operates the lathe's gear control arm to set off increments which at three hydraulically actuated gears allow for rotational speeds up to 160 rpm on the table or chisel.

Duplicator on either-Ryan has taken another Bullard control-turret lathe and fitted it with a Torsion hydraulic duplicator, a high-production machine, or postion capable of stepping up machining speeds, simplifying set-up procedure and improving surface finish. The combination converts the vertical turret lathe into an automatic production tool with considerable time savings.

The attachment consists of a motor driven hydraulic pump supplying oil pressure of 300 psi to a solenoid valve and master control cylinder. The valve is actuated by a master piston which is actuated by the control handle on the control console. The master piston directs oil directly to the control cylinder. The cylinder's piston causes the tool slide supporting the cutting tool.

A typical application of the duplicator is in machining external cone flanges for the J-47 jet. A template containing the cone contour is clamped to the rotary table. The master piston is located on the template and the cutting tool positioned on the flange in exact alignment by means of a concentric dial locking control. With the duplicator operating, the cutting tool maintains tool trajectory below the diameter of the template. Accuracies in duplicating wilton variances of .002 in. are attained with the equipment.

Ryan reports that this method of machining cone shapes from a model has saved about 10 hours over conventional methods. The result, continuous operation of the plant's power load coupled with the duplicator's floating action problem work of "unopposed" machining. Also, it eliminates the use of costly form tools and permits use of conventional tools which are simple to set up.

The duplicator adds \$5,000 to the cost of the \$10,000 lathe, but as proved work and time savings, Ryan says, make this compensation for the investment. And because of its automatic features, the tool allows any operator to handle intricate, high-quality jobs.

### Mammoth Press

A new giant instant hot well soon began operation at Lockheed Aircraft Corp.

The larger addition to Lockheed's production might is on 5,000-ton capacity

hydraulic forming press weighing 2.7 million lb. It was designed by company engineers for fabrication of late gratified aircraft structures. It was built by Bethlehem Steel Pomona & Machine Co., and represents an investment of \$7.500,000.

The press will make possible the production of extremely heavy and unique parts in solid pieces as large as 10 x 30 ft. It can be used for forming work requiring working dies, stretch-forming and hot rolling and welding.

Operation will be by a single control arm, although controls will be placed at all four corners for safety.

The new mammoth will take a 30-ft. diameter foundation 6 ft. thick, requiring 270 cu. yd. of concrete and 35 tons of reinforcing steel. Floor will be equipped from increasing sizes to reduce impact shock.

### USAF CONTRACTS

Recent Air Force contracts announced by Air Materiel Command have included awards for photographic equipment and equipment, machine tools, electronic equipment and for training programs at various schools. Some recent contracts:

**Strategic Air Command**, Langley AFB, Virginia, \$1,000,000 worth parts, plus AF 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 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## NEW PRODUCTION TOOLS



### Jet Blade Miller

A precision machine, specifically designed for such an intricate operation, has been developed by the Northrop Co.

One of the new tools is to great strength and precision all angular shape which cannot be accommodated in standard saw cylindrical grinders. It has a swing over the table of 35 or 36 in. dia. and is suitable in work length capacities of 12 and 96 in. By means of a grip, a range capacity of 50 and 88 in. can be passed. The gap is adjustable in width by moving a pedestal on which the headstock rests. It may be set very wide up to 36 in.

The machine has the traveling wheel head type and a maximum radius of 12 in. The work is held in a fixture which is adjustable in size on a long wheel placed in front of the machine. A small table permits grinding of taper or irregular profile for air or parts with jagged edges is available.

Northrop Co., Worcester 6, Mass.



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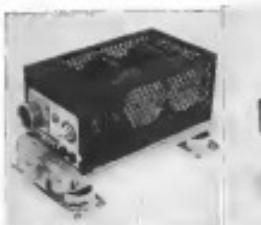
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## EQUIPMENT



GROUND POWER supply and control panel (left) contains voltage and current regulators and associated circuitry. To the right is a current sensing element.



### Unit Controls Jet Starter Current

**Eclipse-Pioneer** contemplating production of device developed to hold torque steady with low amp. loss.

The problem of excessive wear on brushes of jet engine starters, due to the great heat built up in uncontrolled current flow, has been overcome, according to Eclipse-Pioneer, a newly developed ground power supply unit.

With a flick of a switch, the new device automatically limits to a pre-determined value the current and voltage supplied to the starters, reducing the rapid temperature increase in the brushes and wearing of up to 1,000 amperes-equivalent to approximately 3-1/2 kg at 25 v. The switch developed starts rapidly only 50 watts to operate, while the total system demands 750 watts.

What the device does is to measure current, then what it does is to do. Suppose 1,000 amp. has been selected by setting that limit on the maximum current control so that the maximum amperage can go to the generator. While the starter begins to revolve, 1,000 amp. are furnished the starters, until the motor reaches 5 v. At motor gather speed, 1,000 amp. are automatically maintained. So now the current will gradually cause the voltage supplied to direct proportion to the needs of the motor. When the last 25 v. reach the starters, a voltage regulator takes over. Naturally, the current held constant by this time.

An important feature is that the torque imposed by the starters on the engine remains constant throughout the entire starting sequence. This automatic-

torque holding feature that no switches, switches, limiters, limiters, or other controls are required. The engine will start quickly and efficiently, the engine will run more smoothly. Engine life should therefore be improved.

Previously called "Ground Power Supply Generator and Control," the unit is under development at the Eclipse-Pioneer division, Bendix Aviation Corp., Teterboro, N. J. Only a few pilot models have been built to date, but production quantities are contemplated. At present, 500 and 1,000 amp. systems are under consideration.

Heart of the power supply's control system is a thyratron. This diode-shaped magnetic amplifier, the element

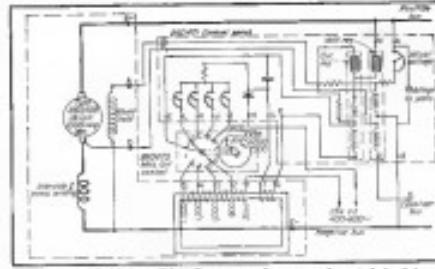
sourcing current produced by the generator, is made up of two windings on a ring having special magnetic properties.

Purpose of one, the current sensing winding, is to determine magnetically the amount of current being generated, and through a carbon pile regulator to limit the current to whatever value has been selected. The other coil, wound on the bar winding, presents a true no-load condition from ever occurring to the magnetic amplifier "since the bar winding carries the same dc current in the negative coil." This is necessary because, when there is no load on the generator, the no current would never change, in a point where the carbon regulator carbon piles would be held open.

► **How It Works:** One side of a 120 v.-400-500 cycle ac current supply is fed through the current sensing winding of the main, through a half-wave rectifier, the current regulator, the bar winding on the magnetic amplifier than to the other side of the ac supply. A standard ammeter is connected across one of the dc if alternating current is not already available on the power unit. A condenser is connected across the regulator and this combination isolates the power unit from the output of the ac power unit and thus insures performance of the carbon pile regulator. Also connected across these coils is a load resistor and a thermal adjustment of the latter permits increasing low maximum starting torque by bypassing certain windings current regulator and

Then the magnetic amplifier, rating current output of the generator, signals the carbon pile current regulator how much current is flowing. Instantaneously, the regulator commands the generator, through its shunt field, to limit current supplied to a given amplitude by lowering its terminal voltage.

► **Tough Toroid:** Unique feature of the



WIRING DIAGRAM shows Eclipse-Pioneer ground power supply control circuit layout.

ground power supply control system is the toroid. Half way down the air is mounted between two supporting brackets. A single copper bar is wound through its center. Both ends have terminals to make external connections. Since the bar carries full output of the generator, it has a large cross-sectional area and is short so that the IR drop or power loss is equal to at least three times the equivalent length of cable. Currents for the current sensing and bias windings are made through a terminal board mounted on top of the coil.

Features of the toroid are:

- Reduction of conduction losses since air has the lowest resistance of all materials used for shock mounting the unit.
- Simplicity and ease of maintenance are indicated by the complete lack of moving parts.
- Reduction of current consumption (approximately 10 watts are dissipated in the windings) means that no special protection will be made for insulation or cooling the toroid. Moreover, since control currents are measured in milliamperes, the unit may be mounted without concern for heat generation.

Polarity is negative and all terminals are designed to insure that they are properly connected.

Complete weight of the unit is 4 lb. Other components of the ground power supply unit are:

- Maximum current control—This is a selector switch with which an operator may choose any one of several maximum starting torque values. One unit uses at Eclipse's plant ultra-low choices 500, 1,000, 1,300 and 1,700 amp. Ampere supplied the startup will not rise above the predetermined value set into the control. Weight is 1 lb.

• Control panel—The component is made up of four parts—a tray assembly containing the control and voltage regulation plus remote control and a shock mounted base frame which the tray is quickly detached. This permits any removal of the unit for maintenance or inspection without having to disturb the base. Total weight is eight lb.

B. G. Adams, Eclipse assistant senior assembly electrical engineer, told *Aeronautical Week* he believes that the compact, light weight, and robust ground power supply and generator control would permit a general and needed job in making jet aircraft starting easier and less wear on starters and engine drive.

#### RAF Compass

The latest Royal Air Force and Navy jet fighters are being equipped with a new type of magnetic compass.

The 500-gram instrument package is only as large as a golf ball.

The R.A.F. as it is called, mounts a compass card graduated in 10-degree in-

**Pioneer and Prime Producer of Radar—**



The Antenna System of the left is a microwave system used in the early stages of the missile system. Using the elements within this system, which is supported by several other antennas, to measure a certain radar distance within the area of the right.

Pioneer and leader in radio communications and radar, **Bendix** Radio manufactures radar systems for civilian and military applications. Bendix is the designer, builder and supplier of GCA radar for the U. S. Navy. The Civil Aeronautics Administration has chosen Bendix to supply airport radar landing systems for 24 of the nation's major airports. Write for your copy of "Keys to Flight," the story of GCA radar.

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Supreme Products, Inc., 2223 So. Calumet, Chicago, Illinois

elements which turn in front of a heating coil. Silicon fluid is used inside the instrument for damping purposes. The compact work equally well in an inverted position.

The EPA was developed by the Adelphi Company Observatory for the Ministry of Supply and is built by Kelvin and Hughes.

### Electronic 'Brain' Controls Fuel Flow

Patt & Whiting's latest jet engine, the powerful J-57 (estimated thrust: 18,000 lb.) is being equipped with a new fuel control.

The new device, developed and being produced in limited quantities by Elgin Div. Standard division of United Aircraft Corp., combines an electronic "brain" with a hydraulically-controlled system to provide the engine precise amounts of fuel for optimum operation.

Harold A. Martin, general manager, Elgin Marine, said that the fuel control "has passed evidence tests at J-57 engines in test cells, and flight testing now is in progress."

The fuel control, Martin said, allows the pilot of a number of aircraft involving operation of the jet engine and accurately controls the speed of the rotor assembly. Sensors units detect air inlet and tail pipe temperatures and engine rpm, then relay this information to the electronic unit. If the engine tends to exceed its design limits, the latter signals the hydraulic actuator to reduce fuel flow.

Ensuring the important safety function of the aircraft was the resulting failure analysis on the part of Elgin Products Corp., Chicago, combined with study by Elgin Standard engineers. For application of vacuum tubes in that a sturdy tube is always available to take over in case of failure of the first tube. Also, miniature sub-assemblies in the electronic unit are "potted" in epoxy coatings of quick-bonding time. Result is immunity to vibration, dust, moisture, fungus, humidity and other destructive elements. Added protection is furnished by enclosing the entire electronic unit in an ultraviolet magnesium casting.

After completion of the subassembly housing, which is plugged onto special sockets in the electronic unit, it is then can be quickly removed and re-plated, eliminating the problem of removing individual circuits or sealed potentiometer, trimmer or coupling by expensive processes.

The unit is the second in their Standards-reducing line of aircraft equipment to reach the production stage. The first was an aircrane refrigeration unit for jet fighter night-fighters, originally used in F-100 jets.

## NEW AVIATION PRODUCTS



### Radar Air Dryer

A new series of air filter desiccants for drying and cleaning air supplied to pressurized radio domes have been placed on the aircraft equipment catalog by the Radium division of Lear Inc.

Coupling an cartridge sizes from 8 to 60 cu. in. of desiccant, the new units provide water absorption capacity to satisfy operating cycle demands of the pressurizing equipment. The desiccant is activated on the outer side of the desiccator. Water vapor and other impurities are adsorbed with a maximum efficiency of 99% with less than 1% resistance to air passage, Radium said.

With such sizes and filter units, we utilized to remove all air dust, moisture, condensing moisture, soluble through transparent tube, when per Grade A, Type IV, weather specification AN-MD-6. Characteristics colors on inside with streaked color code at 8, 20, 40 and 60% relative humidity.

Learn, Inc., Romeo, Michigan, Ohio.

### Plane Stains Erased

A non-abrasive polish that gives a gleaming, satiny sheen to aluminum surfaces on aircraft without reducing the thickness of the metal has been developed by Rader Ammunition Co., San Diego.

The product, Rader 216, removes varnish stains and other blemishes causing shiny areas during aircraft fabrication. It provides a finish that approaches cell film appearance, says Ryan Strain, a surface treatment that does not remove paint by immersion. This means no damage to aircraft. However, the polish does help prevent galvanic corrosion.

Rader developed the new polish when Boeing Airplane Co. requested that

one of the conventional types be used on C-97 freight sections being built under subcontract by Ryan. Boeing desired three planes painted bright red on the 25 per cent aluminum coating so the 205 had to be repainted.

Boeing did not like the look of the C-97 due to the bare steel it had applied to skin surfaces—particularly along the seam where external fasteners held by the firm. Some engineers have found a difficulty in getting paint to go from the surface of sheet metal, thus preventing certain areas that would result if the topcoat were left in contact with the aluminum skin. Rader 216 is easily applied, Rader points out. It was developed by R. W. Thomas, chemical research engineer at the firm.

Rader Ammunition Co., Los Angeles, Calif. See page 12, Col. 2.

### Better Plane Tubing

A patterned reinforcing tubing (Inspec No. T-175) for aircraft tubing, which does not grow larger or support larger loads, apparently has been developed by Extralite Inc.

The product is the first to meet USAF Specification 12017A, an rigid test of Wright-Patterson AFB, the writer claims. The tubing also is said to have excellent low-temperature performance and high dielectric strength.

Extralite, Inc., 1237 W. 13th St., Suite 1000, Elkhart, Ind.

adapted for types supporting loads up to 30 lb. For lower loads, the tubing will not grow larger, instead it shrinks.

And vibration reduction over load ranges from 1 to 60 Hz, we rechargeable with other tubings now being used. They come both in the standard and "Mil-Met" type.

The firm says, Watertown, Mass.

### Air Flow Switch

A new air flow switch, precisely used to protect ground radio equipment, was having airborne applications.

The switch is a solenoid intended for use in cooling and dehumidifying equipment installed in aircraft and in ground-based mobile radars. In case of power failure or air passing obstruction, it generates a coated relay which cuts off power to the tubes. It could, perhaps, be a valuable capacity with airborne remote equipment that requires forced air cooling. And it also may fit many other aircraft applications requiring a sensitive air flow protective switch.

The unit is the first aerospace (air-dashpot) switch of this pressure rating and size, the writer believes. But further reduction in size and weight still can be accomplished easily to meet specific aircraft requirements, the man points out.

Henry G. Dohr, 12-16 Astoria Blvd., Long Island City 2, N.Y.

### ALSO ON THE MARKET

Special rods for smooth (precision-bent and closely supported before delivery) range from 12 to 10 gauge, length from 4 to 24 ft. They come with round, oval, curved or counterbend heads. The Rader Co., 1530 N. Indiana St., Los Angeles.



### Shipboard Mounts

Staggered vibration isolators and mounting bases, constructed to withstand shock loads on aircraft carriers and in naval landings, are being produced by the Rader Corp.

These units are designed to meet shock and vibration requirements of Spec. MIL-S-819 and to support equipment used in JAN-C-124. Mounting base is spiralized so it can be applied to most outdoor equipment.

Considerable strengthening of the framework of the mounting bases, extending relative improvements has been achieved with only small increase in

weight for operation in aircraft can be reduced through use of a single base horizontal plate which isolates vibration and heat effector "sound dead" between shaft and fan blades. Lord Mfg. Co., Erie, Pa.

Head actuators (Geman "D" type) is a steady state instrument having an speed range from 25 to 70,000 rpm, preferred from competing James G. Biddle Co., 1116 Arch St., Philadelphia.

Staggered isolators is supposed to have good, high effective gross-deceleration and other restraining properties. It does not have to be tested and will be less susceptible and safe on land, can be used for clearing carburetors, air cleaners, on Camco Oxidizer Chemical Laboratory, Lawrence, Mass.

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ISSUE OF

# AVIATION WEEK

## FINANCIAL

### Half-Year Comparison: 1951 vs. 1950

Selected U. S. Trunk Airlines—First Six Months

TRUNKLINE	1950		1951		PERCENTAGE	
	TOTAL REVENUES	NET REVENUES	TOTAL REVENUES	NET REVENUES	TOTAL REVENUES	NET REVENUES
American	\$11,670,000	\$1,020,000	\$11,250,000	\$1,020,000	+1.7%	+1.7%
Braniff	11,070,000	1,020,000	11,250,000	1,020,000	+1.7%	+1.7%
Delta	14,480,000	3,800,000	14,480,000	3,800,000	0.0%	0.0%
Eastern	16,480,000	3,800,000	16,480,000	3,800,000	0.0%	0.0%
Northwest	16,480,000	3,800,000	16,480,000	3,800,000	0.0%	0.0%
TWA	16,480,000	3,800,000	16,480,000	3,800,000	0.0%	0.0%
United	16,480,000	3,800,000	16,480,000	3,800,000	0.0%	0.0%
World	11,160,000	1,020,000	12,320,000	1,020,000	+11.1%	+11.1%
Other	1,370,000	100,000	1,370,000	100,000	0.0%	0.0%
Total	83,870,000	10,000,000	88,320,000	10,000,000	+5.4%	+5.4%
U. S. Total	100,000,000	10,000,000	105,320,000	10,000,000	+5.4%	+5.4%
Mid-American	1,140,000	100,000	1,120,000	100,000	-1.8%	-1.8%

\* Braniff's \$1,020,000 profit is after tax returned.  
\*\* Braniff.

### Airline Net Climbing With Traffic

Record-breaking passenger volume and mail, freight, express rise, bring leverage factor into play.

Sharp gains in airline gate revenues together with even greater improvements in net profits per revenue ton made the reports selected by the writer of course for the first six months of that 1951.

Record-breaking passenger traffic has developed a far greater volume of business than the most optimistic industry officials dared to anticipate under that plan.

Passenger estimates plus total revenue passenger loads for the domestic trunk lines for the first six months of 1951 at around \$3.5 billion, up some 45% over mileage for the same period a year ago.

This change in passenger traffic is mainly responsible for the sharp gains in gate revenues for the major lines. While mail, express and freight volume also fits these categories without for a much smaller percentage of the total business of most of the nation's major airlines.

► **Leverage Factor**—Invariably, there is tremendous leverage in airline operations. Once operating costs are covered, virtually all additional revenue accrues flow through to net. Operating costs are about the same whether 25 or 50 passengers are carried on a flight. The leverage factor had an important effect on netline earnings during the first half of this year. In the past, the more the concern, the greater would be the year-to-year increase in net, and brought heavy losses in operations, full the chart of break-even points. Such year sees an increasing number of airlines reporting profits on the first half

is place of the losses in common in the past.

Seasonal characteristics are becoming less pronounced as the operational cost per passenger carried. Thus the passenger salary expenses, increased dependency in all types of weather, and aggressive promotional efforts such as coach and other devices to broaden air travel markets.

► **Seasonal Effect**—The smoothing out of the seasonal fluctuation in air travel is of tremendous import to earnings and serves to compound earnings profits. A large percentage of annual income expenditures, such as the bulk of passed and indirect expenses and depreciation, is amortized by the level of peak traffic volume within the year.

The new record total traffic volume, in other words, cannot result carry greatly increased static loads during off-peak seasons without proportionate increases to their overall expenditures. If such traffic were available, the impact of such a condition would be sufficient to turn around earnings from a loss to a profit during the last half of 1951.

The accompanying table reveals the comparative gate revenue and net income for the first six months of 1950 and 1951 for the Big Four and other trunkline carriers. In all cases, net income up sharply for a gain of 4.1% for Northwest to 64.1% for American. The leverage effect on earnings is highly pronounced in all cases, excepting Mid-American which shows a slight decline in net income.

While the industry trend at both revenues and net income is obviously on the upgrade, no one qualification are present in all cases and temps have the quality of the earnings which have been

► **Mail Rate Effect**—For example, during the first half of the year, the Big Four and Pan Am utilization was reduced for past and present periods. Instead of making a retroactive application to the previous year affected, an adjustment was made in the current first half, affecting net results. Under the Civil Aviation Board decision, a uniform 55-cent-per-mile rate was made to apply for all the Big Four for past periods up to Dec. 31, 1950, estimating back rates early in 1947. Further, a fair 44-cent-per-mile rate was declared effective from Jan. 1, 1951.

On that basis, total compensation requirements for the group (\$616,000 for American, \$379,000 Eastern, \$1,113,000 TWA, and \$1,537,000 for United) But these payments will be reduced by tax credits to the carrier resulting from the board's ruling.

For example, while American was awarded \$196,000 for 1950 and prior years, its savings for past periods were reduced by only \$169,541. This adjustment for prior years, together with the current rate, are taken into 1951 calculations.

Similarly, TWA's award by CAB to have been overstated \$1,254,000 for 1950 and prior years. The net amount of its refund for this period, after tax adjustments was \$667,410. This is reflected as its 1951 earnings statement.

In other words, the net income of the Big Four would have been greater for the current six months save it for these adjustments resulting from the rate cut settlement.

On the other hand, a revenue equally overstated by CAB in the amounts as reflected by TWA. Its award includes in domestic and international operations. On the latter, the carrier continues to operate at a temporary tariff rate which soon would change with 1949. Remaining to be adjudicated in a CAB show cause order which, if made effective, would materially reduce reported earnings for the past two and one-half years.

In a broad sense, the industry's earning power is now limited only by its capacity. Additional equipment is being fed into the system as rapidly as it becomes available. The result, however, is such as to prove that airlines have turned down offers of more than \$65,000 each for three short-haul and high-speedpoint DC-4s. This is the consequence created by boom traffic conditions.

—Sieg Abrahm

# AIR TRANSPORT

## CAA Testing Terminal Baby Omni

Experimental device, cheaper than ILS or VOR/DME, may give all-weather service to local airports.

By E. Lee Shaeffer

A new experimental terminal "Omni" beacon may be the practical answer to the problem of getting reasonably dependable all-weather service to local airports.

Air Transport Assn. and Civil Aviation Administration technicians say that so far as this so-called TVOR is the only device they know that is reliable for both navigation and landing approaches at about one-third the cost of ILS or VOR/DME, and at a tiny fraction of radar cost.

**The Comparison.**—The terminal coverage—TVOR is much like the present enroute coverage. But the TVOR is less power, CAA says, with output around 200 watts and has an standby transmitter. CAA is testing, including two TVORs, one at Washington Dulles and one at Oklahoma City. These have been going about three months. CAA expects the "baby Omni" to be worth every expenditure they had.

CAA has tentative plans to put 75 TVORs into local airports the next few years if money is available, and evaluation power gives the TVOR ready recognition. Current CAA plans are to install 14 TVORs this fiscal year, at about \$4,000 each.

But a minimum of 100 TVORs will

needed at local airports to keep a reasonably reliable airfield available through the weather, service experts say. So the airlines are cutting about for some way to go over TVORs into local spot or a cheaper design, plus a partial solution to the funding financing, they say.

Although CAA-estimated cost is \$16,000 for the TVOR, and only \$14,000 for the "H" facility housing beacon, both are probably available for less. Estimates of representatives are amplified. Multiple airports "H" facilities have been proposed by airlines for around \$2,000 and it is hoped the cost of an Omni can be brought down considerably to time.

**Cost Comparisons.**—CAAs estimated cost for armed permanent and satellite, and for annual maintenance cost, are as follows:

- **Terminal coverage.** Initial cost is \$34,000; maintenance \$5,000.
- **"H" facility housing beacon.** Initial cost is \$14,000; maintenance cost \$5,000.

- **En route control and DME.** Together, but without stand-by equipment for the emergency. Initial cost is \$30,000 for the LVOR and \$22,000 for the DME; maintenance cost is \$6,500 for LVOR and \$2,000 for DME.

- **Standby en route control and DME.**

Total cost is \$162,000 for VOR and \$222,000 for DME; maintenance cost is \$7,500 for VOR, and amounts to \$1,500 for DME.

**Instrument Landing Systems.** Initial cost compares with standby and two markers is \$223,000, maintenance cost is \$10,500.

- **LNAV 4-course range.** No initial cost estimate is available or justified because the optional equipment is to be decommissioned as coverage and DME go on, maintenance cost ranges from \$5,000 to \$7,500.

- **TVOR Advantages.**—Five or relative advantages of the TVOR over other low-cost devices:

- The TVOR, basically on the stand-and-count principle for which all airports will have service by the end of this year. So there is no new airborne equipment needed to use it.
- It will allow weather minimums of 400 ft. ceiling and one-mile visibility, experts say, and experience may validate these.

- The Omni gives reasonable precise and state-free information for both navigation and landing approvals.

- The TVOR can make all runway equally suitable as instrument landing, as it is not a one-directional beam. Its installation would add 16 holes in the standard nationwide VOR/DME navigation system and do it in the same revision.

- **Other Considerations.**—Contrasted with these qualifications, the other candidates for lower-cost landing and takeoff up as follows: The "H" facility provides no course line navigation information, and being low-frequency, it is not an alternative instrument as it is not state free.

Another site being considered is for ILS installations without markers or a standby. That site would provide no course line information and at the same time would restrict the pilot to one runway only.

Finally, the existing ubiquitous L/MF-standard navigation facility for over 20 years will be decommissioned at about 50 locations; it is subject to static, and navigation information is derived by receiver standards.

**Immediate Details.**—But note CAA can install more than a hundred of TVOR baby omnis, and until the service has a way to add more than even the CAA presently plans, most local airport officials relish and appreciate safety levels can remain short while they are now.

Minimally, CAA plans several enter studies evaluation of operation and maintenance in its experimental program. This will packet over \$2 million from its need operation and requires a profit in the neighborhood of ten percent in the process.



ALL-WEATHER GANGPLANK

This model gangplank is one of the latest approaches to protecting the airline passenger from inclement weather, poor winds and turbulent ground conditions while loading his plane. Designed by Aeroplane Engineering Corp., Washington, D. C., the gangplank can be added to any existing aircraft. It is

a fully enclosed, telescoping walkway which can be swung through 180 degrees from ground level to loading door height of any existing passenger plane. The manufacturer says a increased loading efficiency will reduce total plane space of a loading position 50 percent.



WIDE REACH representation, linked by telephone points across the forwarding service.



EMERY PICKUP TRUCK brings load directly to freight plane for fast delivery.

## Emery Sets Fast Forwarding Pace

Because of on-the-spot followups of shipments in transit, Emery's customers can revise production deadlines.

By Kevin J. Ballon

U. S. domestic airfreight has turned out its greatest productivity this year from its biggest single air freight organization—Emery Air Freight Corp. The New York air freight leader is busily amassing a personal cocaine service, doing-to-doors, and operates the maximum speed potential from the entire U. S. transportation set up. By every divergent air freight

► How Fast—How fast can a forwarder be? Emery says it has fastest air mail special delivery cost to coast.

The kind of speed packages Emery offers having much to do with considerations of how far apart the customer is when most other forwarders service. Instead of always a premium for fast delivery, scheduling service and has found that an increasing number of active customers are willing to pay it and wait back for more. In fact, the more expensive use of Emery's services, "blue ribbon," is the one showing the greatest steady increase, now makes up about 65% of the forwarder's business.

Actually the customer can pick either of two basic services:

- **Blue Ribbon.** It is a costly but faster delivery, depending on hours, speeds around-the-clock, 365 days a year. The great majority of blue ribbon freight cannot be consolidated, goes directly to the market, and at the lowest cost directly to the consignee.

- **"Expedited."** freight pickup and delivery are limited to between 6 and 10 days. Most of the expedited loads go to Emery freight terminals, where as much as possible consolidated with other shipping a schedule. In New York, for example, about 90% of the expedited shipping goes to the company's first 50th Street terminal. Emery's annual sales at 101 Second Ave., N. Y. C.

"Shipping in reverse" is a company truly new service selling steady blue ribbon standards for the most part, and as the name implies is a market for a shipment from a consignee through Emery to a consigner. Rapidly increasing, this service now averages about 30400\$ of the forwarder's total shipments.

Emery wants a basic maximum of general expressages, mostly lightweights and others on regular tracking services for handling the portion of the tonnage.

- **Shipping Operations.** The actual ship gone covering an infinite spectrum. The shipments arrive at the port with as little already prepared, as fast as the carrier has only to rate and sign them. As soon as the flight leaves the ground, the airfreight office intercepts it at the next stop, advising its agent there of the shipment, giving the air-line, flight number, and any necessary instructions for transshipment, if any. When the next leg of the flight begins, the airfreight office advises the shipper to hold the cargo until arrival at the other destination, identifies the originating office of the best shipment via data card.

- **The Schedule Factor.** Key factor is the schedule, cargo is transferred from road to carrier, air to surface and vice versa, as often as necessary, by each Emery office or agent, and as often

in economy in effect the best timing specialist division.

The air charter business all along the line has tended in a very fine damage and low claim ratio, the total figure up to the last quarter of '69 being a meager \$10,000 (\$10,000). It also is expensive—Emery's compensation totals more than \$2,000,000 yearly.

Performance like that takes a good organization. From the start the company went into operation on a scale that was big by air charter standards, and Emery's organization is as elaborate as it could have been done on other ways.

President John G. Emery formulated the setup as conceivable detail while he was in the Navy during World War II, heading the Transportation division, Bureau of Supplies and Accounts, Washington, D. C.

The job was to set up to fit high priority shipments, weighing supplies from centers in thousands of pounds were delivered at top speed to various stations of war or being sent out in theaters of war. The way that the best way to do this was to keep back of the shipment all the way to fitting the various seaport ports informed so that they could ensure that it kept moving.

After the war, instead of going back to Rutherford Express, where he had been assistant to the president, Emery formed the air forwarding service by raising \$250,000 through a public stock issue.

► Early Days—Operations began with four offices in New York, Chicago, San Francisco and Los Angeles, with a staff of 34, mostly top-notchmen from his wartime experience or people whose training was similar.

These offices provided a good minimum coverage, but the big problem was to have representation spread far as possible to be able to get business and handle the shipment from the time it had to go to the airplane until it was delivered at the consignee's door. The Emery solved very handily. The company made a deal with Western Union to operate as its agents, thus giving it coverage on virtually every branch in the country. It turned to agents plucked from other gaps.

The business grew and things kept getting better, with more offices being opened at a rapid pace (there are now 23) and the total growing until it is now about 750. Shipments were soaring, over 25,000 in 1967, nearly double that the following year, over 50,000 in 1969, over 90,000 last year.

But communications, on which the offers depended for keeping tabs on dispatches in transit, left a lot to be desired. Teletypewriter was expensive, teletype linked speed. So last year Emery began linking up its stations

by teletype to the East and Middle West and telecenter from the Midwest to the Coast. It now has 22 offices connected with the system.

► Computer Beta—Emery is strong in established service as a "computer beta" for industry, using air freight's speed potential to extend production well beyond deadlines, also to cut the cost for manufacturing costly inventories.

As an example it cuts the cost of Continental Coal, which previously accounted for 10 percent of its tonnage, by 36 percent in air charter plant breakdowns. Now, by using Eastern Air Freight to supply needed parts, it needs only those spare locations, has cut inventories from \$12 million to \$6 million and expects to reduce them further to about \$4 million. Also to be taken into consideration are the savings in personnel, upping of the schedules, insurance and in fact without end.

With savings like these, and that is not an isolated instance from the Emery's files, it is evident that transportation costs come down to bring



CAPITAL AIRLINES' ticket machine issues three-part ticket, now 25 ms. per passenger.



WAHABAN AIRLINES' modified cash register quickly checks in passengers and luggage.

## Machines Ease Counter Problems

Capital and Hawaiian Airlines have gone to what two engineers consider to be the quickest handling ways to settle passengers' bills by speed of the handling of long lines of passengers in transit at the counters.

The device now being used by Capital is a ticket issuing machine which has shown time savings of 25 seconds per passenger. Hawaiian's new model, yet to be used in check-in, the passengers and thus baggage after tickets have been issued, and not only enables the carrier to get better plane utilization, but saves over \$90,000 a year.

► Capital Way—Capital's unit at Washington National Airport issues tickets for New York, Pittsburgh, Cleveland, Detroit and Chicago. These cities are

destinations of 80% of outboard Capital traffic to Washington.

Craftsmanship features of the machine is its electronic programming feature. The pass and destination of the ticket issued is automatically listed on the ticket itself. The ticket itself doesn't have to make any key-punching entry on the side.

► Operations—Here's the ticket-issuing apparatus with this machine. Washington customer uses a one-way ticket to Chicago. Agent runs to the one-way bank of buttons and pushes the one issued Washington-Chicago. Ticket machine records the sale and inserts a three-part ticket, which includes auditor's copy, passenger's copy, and the ticket itself, with price indicated.

Agent writes flight number and de-

parture time on ticket for customer checker.

Capital figures the 25-second-per-passenger savings is deadly valuable at rock-bottom fares. Delay in ticketing 28 to 30 passengers per plane at the airport a few minutes before departure is not uncommon since some customers remain to the unseated, pre-feeding and waiting at the counter end, of times, delayed plane departure causing bad customer relations for continuing passengers.

► Hawaiian Way—It's Up—Hawaiian's cash register, however, comes up with the right answer for automatically and speedily recording passenger and baggage samples and other pertinent flight data. Here's how the machine functioned for the operation by the National panel operators:

The passenger buys his ticket to the gal at the check-in window at the airport. She reads his name on the ticket, then addresses him by name to ask his weight. On the modified cash register she rings up the passenger's number on the flight (whether he is in the 1st, 1d 3d passenger to check in), his weight and a round-trip amount code number indicating his flight.

His weight is added to that of other passengers on the same flight, who buy bigger bags, with a cumulative total for the flight easily available at all times.

He is given a flight card, documenting his flight and also the same serial when buying up on the counter. When total numbers are added up to the total number of reservations, the clerk leaves the flight passenger list but leaves

the ticket itself blank for the carrier to fill in.

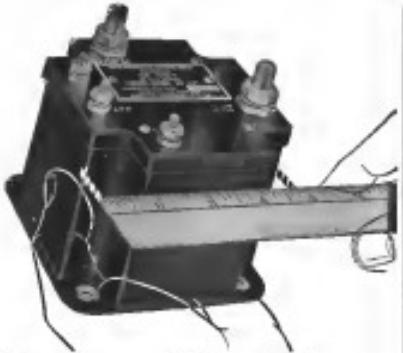
While NASA's test program is working to advise of the Tucson conditions recommended that GCA insist that all crew flying be done with shoulder harness and all nonessential should provide for shoulder harnesses ranging from +200°F. to -150°F., as well as relative humidity from 20% to 85%.

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\*Manufactured in SWITZERLAND (Span. MTE-C-5036). Literature on request.

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## TWA Plans More Air Coach Service

Twa World Airlines plans to start two more air coach services, one each to San Francisco.

One will be TWA's third transcontinental air coach, now flying daily from New York, the other is an extension of the Kansas City-Los Angeles daily coach run by the coast to San Francisco.

TWA already operates two All-purpose Constitution coaches a day, both to Los Angeles. The new San Francisco coach will be a 16 passenger DC-8. Captain's daily roundtrip coach service now operating are two New York-Los Angeles Convars, a New York-Chicago DC-4 via Pittsburgh, and a Kansas City-Los Angeles DC-8.

TWA is reported planning another line of the 72-passenger Constitution to replace the old Convair 440s also put up high bid of \$318,000 by a CAA Constitution in almost new condition. Trans World's north coaches have sold well since its first transcontinental coach flight last year which actually carried 114 persons—75 adults, 32 babies and one cat.

## New Services for Alaska-Northwest

Both Pacific Northwest Airlines and Alaska Airlines, certificated by the CAB to serve Anchorage, have signed from Pan American, One and Seattle Air Lines hope to start operations about Aug. 15.

Each has a DC-4 underaging commitment to provide metal dairy service, with nose equipment expected late Pacific Northwest bought its plane for a of Mexico, now is having it converted reported \$500,000 from American Giant by Grand Capital in Los Angeles.

Alaska Airlines has received the release of one of its DC-4s from MATS, now is doing the necessary conversions in its Anchorage Field along with of Seattle MATS has two older DC-4s which Alaska Airlines hopes to get here soon.

Pacific Northwest will be flying primarily in Anchorage while Alaska has one base each in Fairbanks, Alaska Airlines has been flying scheduled routes on 5,000 miles in Alaska for the last 17 years, expects these routes to feed heavy into the new Fairbanks-Sitka-Perfume run.

Both lines will be the Seattle-Tacoma International Airport—Pacific Northern continuing to do its nonstop service at Seattle Boeing Field and Alaska Airlines at Paine Field. Pacific Northern would like to get hangar space at Seattle-Tacoma but none is available, and construction, even in conjunction with another lot, would be expensive.

## Mail Pay Accounts

Domestic airlines are about square with the payment on land mail pay accounts; international airlines are owed some back pay, but substantially less than they ask. Civil Aviation Board Chairman Donald Nyrip states in a letter to Sen. Edward C. Johnson:

"There will be little if no liability for additional mail compensation in the domestic carriers, including both transoceanic and short route operators," according to Nyrip's letter to Transportation and Postmaster General Casper Weinberger, Sen. Johnson.

Airfares on roundtrips to some nations will affect liability the government's Dec. 15, 1958, contingent liability of about \$88.5 million for back mail claim by the domestic carriers.

As to international carriers, Nyrip says: "The Board's analysis in the international field are not as far advanced as the analysis completed in the domestic case, but it is the Board's present judgment that the fair and proper method to the American flag carriers in the international field will be substantially lower than the indicated contingent liability."

CAB figures contingent liability based on carriers' claims for back mail pay international, \$77,302,000, regional, 342,000.

An example of how the contingent liability really works, Nyrip points out that the Big Four carriers—American, Eastern, TWA and United—released \$6.5 million in back mail pay for 1947-50. But the airlines ended up owing the government about \$3.5 million instead, estimated by the account settlement on a percentage scale which is figured at 65 cents a ton mile.

## SHORTLINES

• All-American Airways—AAA advises the press that AAA "will be a perfect safety record," and that the recent C-46 accident in Newark was by an unqualified Miami charter with the same name. Last year AAA had added local service airline All American. "It will be adopted by the name before we die. There is little we can do about it legally."

• Australian National Airways—ANA reports a 64% increase in passengers carried and 26.5% in air freight the year ending June 30, 1961, compared with a year ago. Passengers numbered over 650,000 and freight weighed 725 million lbs.

• Central Airlines—Central's July per-

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## COCKPIT VIEWPOINT

By Capt. R. C. Robins



### Transition From Instrument to Visual Flight

(This is the start in a series of *AIR-WATCHER Flying*—Part I and II appeared in *AVIATION WEEK* July 23 and Aug. 13.)

The psychological effect of a Weather Bureau raining report is a major stress, though seldom discussed. Experienced pilots, knowing the seriousness of these reports, plan each instrument approach for "rock-bottom" conditions, at which point they will be opposite the situation. The trickiest part of any approach is the transition from instrument to visual flight.

If a ceiling has been reported as "measured 400 feet" the pilot is led to believe that transition should occur at about that altitude. Certain cockpit procedures may be altered by this assumption. If the measured point is over an unhealthy condition, overcast.

► **Critical Altitude:** It is also possible that by using weather observations as the sole criterion, some minimum may be set too low for safe penetrations. If a critical altitude concept were used, having minimum altitudes on terrain, aircraft and pilot performance, equipment, etc., the pilot would be assured that his plane was capable of a safe go-around.

Some interesting information on the subject can be found in *Flying* magazine in a series of test approaches made by the Spanish Cognac Co. on ILS. An analysis of the results shows that successful landings that 100% would have terminated in successful landings on a runway 150 feet as wide provided the pilot was able to measure the altitude with visual reference to the runway 3,000 feet from the approach end. (Angle was a DG-13.)

An analysis of the relevant landing test approaches indicates that 100% would have terminated in successful landings at a 178-foot runway if the pilot had been able to measure the altitude with visual reference to the runway 190 feet from the approach end.

► **The manual landing handling performance is approximately + as effective as the automatic.**

These conclusions subsets that both automatic approaches and visual approaches are in no way better or worse than instrument approaches with constant altitude. High intensity runway lights at red bold maturity surface markings provide the only identifying means.

► **Instrument Approaches:** Lower approaches mean closer tolerances in all parts of the system. This is especially true of cockpit instruments where such factors as lag, accuracy of reading and arrangement need much improvement.

The measurements made by Sperry on the ILS test approaches show that there is approximately one second from the time a pilot moves to space until the pilot can observe this movement on his ILS computer. Other instruments have their own lag intervals. These intervals must be shortened.

The success of an instrument approach is closely allied with maintaining an accurate heading when close to the runway threshold. Heading indications in use today cannot be read accurately to close to 3 degrees. They should permit 1 deg. settings.

► **Programs:** Programs for all weather flying can be materially lengthened by the use of computers in your series.

- There must be a thinking and judgment change from the weather minimums in the control altitude concept.
- Necessary equipment must be installed as a system, not piecemeal.
- Reinforcement and re-arrangement of instruments will facilitate lower approaches.

## WHAT'S NEW

### New Literature

An *Aviation Information Source*, 6 volumes, edited and published by the Av-Appliance Institute, 412 Scott Building, Portland, Ore. For the complete set, \$12.50; special rates in quantity.

For the agricultural plane operator, as pilot, as well as the farmer who is using or intends to use three severs, they are volume in content the basic knowledge needed for profitable work in an expanding field which is based by various technical and legal hazards for the operator.

Each of the six volumes specialists in a particular phase of the operation:

- Vol. 1, Agriplane Checkups, 168 pages, details insect holes, weed holes, disease problems, soil conditions, growth regulation, plant food and seed treatment.

- Vol. 2, Crop Protection, 155 pages,虫害, 鳥害和病害。

- Vol. 3, Sprays and Dots, 113 pages, it's title suggests, a working handbook on the aerial seed application process, covers spraying, distribution, good practices, seed selection, seed treatment, sprayer selection and maintenance requirements.

- Vol. 4, Efficient Equipment, 92 pages, gives precise technical data on essential equipment, sprayer and cluster components, types of sprays, insect and ground spraying equipment and experimental development. It covers field conversion plans and helicopters.

- Vol. 5, Legal Problems, 96 pages, provides a working knowledge of federal, state and local laws regarding agricultural aviation, including CAA regulations.

- Vol. 6, Weather, 165 pages in a chaptered directory among in a quick reference guide for information on agricultural operations, weather and agricultural components, crop, soil, climate, tree and forest sprays and the other numerous topics which can provide valuable information to the professional aviator.

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These volumes are profusely illustrated with photographs and detailed drawings.

The Flying Club, a booklet on the organization and operation of flying clubs, has been prepared by CAA, and is now available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Included are articles on organization, suggested by-laws, suggested rules and manual, methods and forms for flying club units of flying and membership dues. Price is 25 cents.

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## LETTERS

### ALPA's Troubles

I have as close as anyone in the internal workings of the Air Line Pilots Assn. for a good many years and know that ratings point issues of the record were released and shared with pilots and controllers before reaching the head of the list and awaiting.

Thus, for the sake of the record, I would like to assure you with a few short versions of my views:

Care was damaged by friends. Not so those [sic] [sic]. No by his own indecisive words it is all of his fault. To my knowledge he has never approached the pilots or the properly elected members of this team. Those losses have never personnel at all. None would take adverse action to him. Those who pushed went forward. As far as I recall were the ones who supported an upturn of a due date [sic] before pressure from the publicization of his long and honorable service.

The only "plot" is ALPA concerning Dick Brinkley was a plan advanced by several of the pilot representatives on the internal issue.

I believe due to President Emeritus of ALPA, his Mr. [sic] in whose shadow that our unity being reduced.

To keep his unit knowledge, experience and plot available for the benefit of the present pilots and the rest of his day.

He advanced by mistake of memory from the days past when he was flying more senior upon which he started and when caused him to do himself considerable harm.

In a proper place from a judicial and let less because the legend to this pilots which he had as easily caused by doing his job.

More "victims" would have welcomed this "plot" with open arms. That Dove chose the alternative of going down in a series of blood and gore at the unwise rate of pulling everything he had created down with it is a fact. But in itself follows a decision which he made against the severe pleadings of his older and research experts.

His continued attempts to sustain us of his, by legal action, in spite of his small by the way, still abounds is indicative of the attitude which brought about the small in the first place.

The theory which has received some reflection, is the other that many individuals were hoping to peek his job as a result of his downfall at chairman. I presented over the discussion and can truthfully say for a while it looked like we might have to use a rifle to dictate who we could get to take this so-called "job."

However, come again it was when taken by Davis himself which solved the problem. The men best qualified to fill the job Chairman of ALPA, were available and also happened to be the ones who in the main out of a pool of a couple of Bubba's [sic] declining him several days before.

It is always disturbing to see a strong man go down, particularly when he is a close friend and associate and in addition

when the actions itself could easily have been made unnecessary and thereby avoided. However it is now "water over the dam" and the pilots with strength not yet condonized but as fact greatly enhanced as a result of the necessary steps taken and compensated by the diversity.

Some important and obvious departing points are: 1. Properly approach the public all on an air but not of course to the press. 2. The press have no considerate, which is a definite explains why your publication has ended in rapidly by the top as the plane's favorite.

JESSIE E. WILSON  
First Vice President  
Air Line Pilots Assn.

### From Hy Sheridan

Congratulations on having R. G. Robison write for you. His stories are honest, however, and I hope he will continue to do so.

The whole thing is some kind of a lesson though, and one must have been helpfully given a second advance! Here goes a sum with intelligence by 1) an airline pilot, and 2) a writer!

HARRY WADDELL SHERIDAN  
595 Baldwin Road  
Glen Ellyn, Ill.

(Like Capt. Astana, who writes Cockpit Viewpoint at AVIATION WEEK, Mr. Sheridan also is an American Airlines pilot.—Ed.)

### The Canberra Story

Concerning the State's Canberra story (AVIATION WEEK July 23). I can assure you that everyone at Martin not only appreciated the way the story was handled but consider it an exceptionally responsible and carefully prepared analysis of the situation. It is true that Capt. Astana has a few of the opinions expressed last month at all with the very able factual reporting which characterized the piece.

RICHARD W. DAWSON  
Director of Public Relations  
The Glenn L. Martin Co.  
Baltimore 3

### Pilot Insurance

I have read with interest your editorial, "Pilot Insurance," in *AVIATION WEEK*, June 19, 1951. I would like to add my support for insurance companies offering airline pilots life insurance at the entire premium rate of \$3.50 per thousand. At the current time I am paying \$4 per thousand on my policy and have just reduced my rates on another policy I had for about 15 years. I am sure that the insurance companies for the latter period were apt (HDL, and the Kinney interests). The company says it has not been granting full coverage when there is an aviation hazard.

R. W. M.

(Editor: Ralph H. Wood, whose editorial usually appears on this page, is on vacation.)

[We are told by the Board of Directors of General Life Insurance Co. of New York that they offered this rate. "Cost record sailing pilots, including co-pilots and members of the crew flying airplanes in the world for United States or Canadian registered seafarers certified by the aviation authority of either country as skilled or expert, provided that such skill has been possessed at least three years, and that the premium is composed of two parts." Annual extra, \$2.50 per \$1,000, says head of the insurance Astoria. Waco will be glad to provide names of other companies offering this rate, if they will reply in—Ed.]

## CLASSROOM

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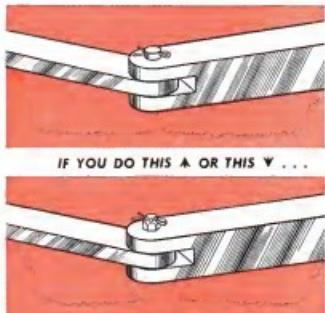


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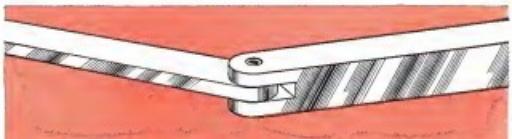
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